

minima just given. Greatest *daily ranges* vary in New England, from 17° at Eastport to 30° at Springfield and 31° on summit of Mt. Washington; Middle Atlantic States, 21° at Sandy Hook to 35° at Ft. Whipple; South Atlantic States, 23° at Cape Lookout and Charleston to 32° at Charlotte; East Gulf States, 14° at Key West to 36° at St. Marks; West Gulf States, 19° at New Orleans to 33° at Corsicana; Ohio Valley and Tennessee, 28° at Cincinnati to 36° at Nashville and Knoxville; Lower Lake Region, 24° at Buffalo to 32° Rochester; Upper Lake Region, 23° at Milwaukee to 29° at Alpena; Upper Mississippi Valley, 25° at Davenport to 29° at St. Paul; Missouri Valley, 32° at Leavenworth to 40° at Omaha and Yankton; Plains of Nebraska and Kansas, 45° at Dodge City and 49° at North Platte; Rocky Mountain stations, 34° at Virginia City to 51° at Santa Fe; Western Plateau, 32° at Pioche to 47° at Winnemucca; Pacific Coast, 21° at San Francisco to 43° at Los Angeles.

*Frost* injuring vegetation is reported as follows: Knoxville, Tenn., 20th; Cincinnati, Ohio, 19th, 20th, 28th; Wilmington, N. C., 20th; Gainesville, Ga., 19th to 21st; Vevay Ind., 23rd, 28th; Spiceland, Ind., 12th; Arlington, Ind., 23rd; Muscatine, Iowa, 19th; Fallston, Md., 20th; Sandy Springs, Md., 29th; Lebanon, Mo., 18th; Plattsmouth, Neb., 18th; White Plains, N. Y., 29th; Keosauqua, N. Y., 29th; Murphy, N. C., 13th; Egypt, Pa., 29th; Charlotte, N. C., 20th. *First frosts* of season: Brookhaven, Miss., and Green Springs, Ala., 19th; Gulf Hammock, Fla., 23rd; Jersey City, N. J., 29th; Princeton, Cal., 17th; Lenoir and Weldon, N. C., 13th.

*Ice* is reported to have formed as follows: Ft. Wallace, Kan., 10th,  $\frac{1}{2}$  in.; Ft. Union, N. M., 11th; Morristown, Dak., 24th; Hennepin, Ill., 19th,  $\frac{1}{2}$  in.; Riley, Ill., 19th,  $\frac{1}{2}$  in.; Mt. Sterling, Ill., 22nd; Laconia, Ind., 12th, 13th, 19th,  $\frac{1}{2}$  in.; Ft. Wayne, Ind., 28th,  $\frac{1}{2}$  in.; Afton, Iowa, 18th; Guttenburg, Iowa, 19th; Cresco, Iowa, 22nd,  $\frac{1}{2}$  in.; Ft. Madison, Iowa, 31st, 2 in.; Monticello, Iowa, 27th,  $\frac{1}{2}$  in.; Independence, Kan., 22nd,  $\frac{1}{2}$  in.; Holton, Kan., 18th, 31st; Creswell, Kan., 27th,  $\frac{1}{2}$  in.; Bowling Green, Ky., 19th, 21st; West Waterville, Me., 29th, 30th; Gardiner, Me., 7th; Mechanic's Falls, Me., 28th; Fallston, Md., 27th; Fall River, Mass., 29th; Oregon, Mo., 18th; Plattsmouth, Neb., 18th,  $\frac{1}{2}$  in.; Genoa, Neb., 18th,  $\frac{1}{2}$  in., 25th to 31st; Auburn, N. H., 29th,  $\frac{1}{2}$  in.; Trenton, N. J., 29th; Somerville, N. J., 29th; Linden, N. J., 22nd; Wappinger's Falls, N. Y., 29th,  $\frac{1}{2}$  in.; Flushing, N. Y., 29th,  $\frac{1}{2}$  in.; Schroom Lake, N. Y., 25th; Murphy, N. C., 13th; Westerville, Ohio, 28th, 29th,  $\frac{1}{2}$  in.; Ruggles, Ohio, 28th; Cincinnati, Ohio, 28th; Ringgold, Ohio, 20th, 29th,  $\frac{1}{2}$  in.; North Lewisburg, Ohio, 26th,  $\frac{1}{2}$  in., 28th,  $\frac{1}{2}$  in.; Pittsburg, Pa., 31st; Catawissa, Pa., 7th, 13th, 21st, 22nd, 26th, 28th, 29th; Fallsington, Pa., 29th; McMinnville, Tenn., 28th, 31st; Mt. Solon, Va., 29th; Snowville, Va., 20th; Wytheville, Va., 18th, 19th; Dover Mines, Va., 29th,  $\frac{1}{10}$  in.; Broad Oak, Va., 21st; Bloomfield, Wis., 19th; Neillsville, Wis., 19th,  $\frac{1}{2}$  in.; Leavenworth, Kan., 27th; North Platte, Neb., 11th; Denison, Tex., 27th; St. Louis, Mo., 19th; Madison, Wis., 19th, 22nd, 26th; Chicago, Ill., 31st; Buffalo, N. Y., 28th; Cairo, Ill., 19th, 23rd, 28th, 31st; Morgantown, W. Va., 29th; Philadelphia, Pa., 29th.

*Ground* was reported frozen as follows: Southington, Conn., 29th; Mt. Sterling, Ill., 27th; Nora Springs, Iowa, 22nd; Holton, Kan., 31st; Mt. Desert, Me., 29th; Auburn, N. H., 29th,  $\frac{1}{10}$  inch; Bethel, Ohio, 28th; Strafford, Vt., 29th,  $\frac{1}{2}$  in.; Waupaca, Wis., 25th to 31st, over 1 inch.

## PRECIPITATION.

On chart No. III is illustrated the general distribution of the rain-fall for the month. On the left side is a table giving the average precipitation for October, which shows an excess in most districts, which is largest from Minnesota to the Lower Lakes and in the Southern States. The rain-fall was about normal in New England and Oregon, but deficient over the western plains and in Florida, where prairie fires and droughts occurred.

*Special Heavy Rains.*—1st, Pembina, Dak., 2.56 inches. 3rd, Creswell, Kan., 3.00 in. in two hours, between 8 and 10 a. m. 9th, New Orleans, 2.10 inches. 10th, Thomasville, Ga., 4.97 in.; St. Marks, Fla., 3.30 in.; Mobile, Ala., 2.40 in.; Camp Barrancas, Fla., 5.39 in. 11th, Cape Lookout, N. C., 3.30 in.; Smithville, N. C., 2.67 in.; Portsmouth, N. C., 3.26 in.; Thatcher's Island, Mass., 3.78 in. 12th, Mendon, Mass., 3.00 in.; Wood's Holl, Mass., 2.56 in.; Newport, R. I., 3.11 in.; Boston, 2.93 in.; Westborough, Mass., 2.43 in.;—12th and 13th, Fall River, Mass., 3.30 in. 13th, Newport, R. I., 3.31 in. 16th, Pembina, Dak., (15th and 16th,) 2.79 in. 22nd, Sandy Springs, Md., 3.57 in.; Cape Lookout, N. C., 4.06 in.; Wilmington, N. C., 3.12 in.; Smithville, N. C., 4.39 in.; Portsmouth, N. C., 3.48 in. 22nd and 23rd, Emory Grove, Md., 5.00 in.; Weldon, N. C., 3.25 in. 23rd, Baltimore, Md., 2.60 in.; Westborough, Mass., 3.05 in.; Mendon, Mass., 3.45 in. 23rd and 24th, West Waterville, Me., 6.30 in.; Mechanics Falls, Me., 4.25 in.; Gardiner, Me., 4.91 in.; Dunbarton, N. H., 3.45 in. 26th, Sterling, Ill., 3.50 in. 29th, Camp Barrancas, Fla., 2.75 in.

*Largest Monthly Rainfalls.*—Camp Barrancas, Fla., 9.93 inches; Mt. Forest, Can., 9.86 in.; Cape Lookout, N. C., 9.20 in.; West Waterville, Me., 8.49 in.; Smithville, N. C., 8.29 in.; Kittyhawk, N. C., 8.21 in.; Portsmouth, N. C., 8.03 in.; Gardiner, Me., 7.81 in.; Thatcher's Island, Mass., 7.57 in.; Oswego, N. Y., 7.55 in.; Buffalo, N. Y., 6.86 in.; Erie, Pa., 6.83 in.; Cape Henry, Va., 6.80 in.; Boston, Mass., 6.76 in.; Waltham, Mass., 6.66 in.; Pembina, Dak., 6.61 in.

*Smallest Monthly Rainfalls.*—Ft. Union, Ft. Craig and Santa Fe, N. M., none; Laredo, Tex., and Ft. Lyon, Col., trace; Cheyenne, Col., 0.04 inch; Ft. Garland, Col., 0.08 in.; Winnemucca, Nev., 0.07 in.; Dodge City, Kan., and Pilot, Tex., 0.09 in.; Austin, Tex., 0.12 in.; North Platte, Neb., 0.13 in.; Ft. McPherson, Neb., and Los Angeles, Cal., 0.14 in.; Stockton, Tex., 0.17 in.; Yankton, Dak., 0.18 in.; Morris-ton, Dak., 0.20 in.; Castroville, Tex., 0.21 in.; Sydney Barracks, Neb., 0.24 in.; Norfolk, Neb., 0.26 in.; Ft.

Wallace, Kan., 0.28 in.; Boise City, Idaho, 0.30 in.; Campo, Cal., 0.31 in.; San Buenventura, Cal., 0.34 in.; Concho and Boerne, Tex., 0.40 in.

*Drought.*—Milton, Fla., 31st, very dry month, ground too dry for seed to germinate. Forsyth, Ga., 22nd, many wells have failed; water courses so low that mills are only partially able to do their work. Vail, Iowa, 31st, ground very dry. Clarksville, Tex., first half of month severe drought. Austin, Tex., 31st, most severe drought ever known here.

*Hail.*—Fort Porter, N. Y., 30th; Summit, Col., 5th; New Harmony, Ind., 5th, 6th; Vevay, Ind., 18th, 22nd, 27th, 30th; Guttenburg, Ia., 1st, 8th; Cresco, Ia., 8th, 10th; Tabor, Ia., 15th, Boonsboro, Ia., 10th, Independence, 17th; Fort Madison, Ia., 8th; Creswell, Kan., 3rd, 16th, 26th; Bowling Green, Ky., 27th; Springfield, Mass., 9th; Grand Rapids, Mich., 5th, 8th; Northport, Mich., 17th; Oregon, Mo., 6th, 16th; South Hartford, N. Y., 9th; Cape Vincent, N. Y., 29th, 31st; Margarette, Ohio, 27th; West Charlotte Vt., 31st; Leavenworth, Kan., 10th; Burlington, Ia., 8th; near Cleveland, Ohio, 18th; Newport, R. I., 31st.

*Rainy Days.*—The number of days on which snow or rain has fallen varies as follows: New England, 8 to 18; Middle States, 7 to 12; South Atlantic States, 5 to 10; Gulf States, 5 to 12th; Ohio valley and Tennessee, 9 to 15; Lower Lake Region, 12 to 18; Upper Lake Region 15 to 22; Upper Mississippi Valley, 9 to 14; Lower Missouri Valley, 6 to 13; Northwest, 9 to 13; Rocky Mountains, 0 to 10; Western Plateau, 0 to 8; Pacific Coast, 1 to 3,

*Cloudy Days.*—For New England the number varies from 8 to 14; Middle States, 5 to 10; South Atlantic States, 5 to 9; Gulf States, 4 to 20; Ohio Valley and Tennessee, 6 to 11; Lower Lake Region, 6 to 14; Upper Lake Region, 11 to 14; Upper Mississippi Valley, 3 to 12; Lower Missouri Valley, 5 to 9; extreme Northwest, 9 to 21; Rocky Mountains, 0 to 12; Western Plateau, 0 to 3; Pacific Coast, 1 to 0.

*Snow.*—5th, Kan. 6th, Md., N. H. 8th, Dak. 9th, Kan. 10th, Kan. 11th, N. M., Kan. 13th, Wy. Ty. 16th, Dak., Neb., Wy. Ty. 17th, Minn., Ind., Ia., Dak. 18th, Mich. 19th, N. Y., N. H. 20th, Wy. Ty., N. Y., Vt. Kan., N. H. 21st, Neb., Dak., Ia. 22nd, Kan., Ill. 23rd, Neb., Wy. Ty., Kan., Dak., Me. 24th, Dak., Neb., Wy. Ty., Ia., N. Y., Col., Mich. 25th, Kan., Neb., Col., Dak., Mich. 26th, Kan., Neb., Ill., Ind., Ia., Mich., Mo., Wis., Col., Dak. 27th, Dak., Ind., Ia., Mich., Minn., Ohio, Wis., Ill., Pa., N. H. 28th, Dak., Minn., Ia., Mich., N. Y., Ohio, Pa., Wis., N. H. 29th, Dak., Minn., N. Y., Ia., W. Va., Wis., Neb., Mich., Ohio. 30th, Ill., Ind., N. Y., Ohio., Wis., Ia., Mich., W. Va. 31st, N. Y., Ind., Md., Ohio, Pa., Va., W. V., Mich., Tenn., N. H. At the end of the month the depth of snow on ground was reported as follows: Cincinnati, Ohio, trace; Ringgold, Ohio, 1 inch; Pembina, Dak., 1 in.; St. Paul and Duluth, Minn., 1 in.; Marquette, Mich., 4½ in.; Escanaba, Mich., trace; Madison, Wis., ¼ in.; Chicago, Ill., ¼ in.; Grand Haven, Mich., ½ in.; Alpena, Mich., 1 in.; Cleveland Ohio, trace; Rochester, 1-5 in.; Oswego, ¼ in.; Columbus, Ohio, ½ in.; Mt. Washington, N. H., 2 in. On the 12th, the observer at New Westminster, B. C., reported the snow on mountains almost to winter-line, one month earlier than the mean for the last five years. Heavy snow fell at the base of Pike's Peak October 26th and 27th, while but little fell on the summit, where the weather has been remarkably mild and pleasant. At Summit C. P. R. R., 12.13 inches of snow fell during the month.

## RELATIVE HUMIDITY.

The average percentage of relative humidity for the month ranges as follows: New England 65 to 80; Middle Atlantic States, 62 to 77; South Atlantic States, 69 to 79; East Gulf States, 67 to 76; West Gulf States, 65 to 71; Lower Lake Region, 63 to 73; Upper Lake Region, 67 to 73; Ohio Valley and Tennessee, 59 to 71; Upper Mississippi Valley, 60 to 65; Lower Missouri Valley, 54 to 61; Red River of the North Valley, 69 to 78; Eastern Slope, from Dakota to interior of Texas, 52 to 70; Western Plateau, 24 to 54; California, 41 to 73. *High stations* report the following not corrected for altitude: Mt. Washington, 88; Virginia City 60; Cheyenne, 47; Denver, 28; Santa Fe, 23.

## WINDS.

The prevailing winds at the Signal Corps stations are shown by arrows on chart No. II, by an examination of which it will be seen that they have been northerly along the Middle and South Atlantic States; southerly in New England and from the Lower Lakes to the Southwest, and northwesterly in the Upper Lake region, the Northwest and thence westward.

*Total Movements of the Air.*—The following are the *largest* monthly movements recorded at the Signal Corps stations, viz: Cape May, 13,478 miles; Portsmouth, N. C., 12,292; Cape Lookout, 12,162; Kittyhawk, 11,841; Sandy Hook, 11,776; Thatchers' Island, 10,813; Dodge City, Kan., 10,558; Sandusky, 10,430; Cape Henry, 10,289; Barnegat, 10,152; Milwaukee, 10,150; Breckenridge, 10,115; Key West, 10,101; Grand Haven, 9,957; Fort Sill, Ind. Ty., 9,836. *The smallest* are: Visalia, Cal., 1,574 miles; Knoxville, 1,666; Lynchburg, 2,208; Augusta, 2,509; Uvalde, Tex., 2,625; Nashville, 2,764; Los Angeles, 2,869; Boise City, Idaho, 3,398; Davis, Tex., 3,463; Eagle Pass, Tex., 3,508; Montgomery, 3,636; Shreveport, 3,667; Springfield, 3,923; Fort Craig, N. M., 3,703; San Diego, Cal., 3,872.

## VERIFICATIONS.

*Indications.*—The detailed comparison of the tri-daily weather indications, with the telegraphic reports for the succeeding twenty-four hours, show the greatest percentage of omissions to be 0.4 per cent., and of